REMARKS/ARGUMENTS

Re-examination and favorable reconsideration in light of the above amendments and the following claims are respectfully requested.

Claims 20 - 32 are pending in the application. Claims 20 - 27 and 30 - 32 were rejected over the combination of the Wojciehowski et al. and Schafer references of record. Claims 28 and 29 stand withdrawn from consideration.

By the present amendment, claims 20, 23, and 25 have been amended and claims 21, 22 and 32 have been cancelled without prejudice.

All rejections based on the combination of Wojciehowski et al. and Schafer are traversed by the instant response.

The present invention relates to a system for generating accessory power from a gas turbine engine. The system comprises means for monitoring torque change on a rotor drive shaft which is indicative of a power demand change; a full authority digital engine control device; means for supplying information about said monitored torque change to said full authority digital engine control device; means for supplying bleed air from said engine during a transient state in response to said monitored torque change; and a pneumatically operated means for receiving said bleed air and for generating shaft power to operate equipment onboard an aircraft and to reduce demand for shaft power from said rotor drive shaft, thereby increasing stall margin available to a high pressure compressor of said engine.

As pointed out in the specification, gas turbine engine high pressure compressors operate steady state along an operating line of increasing flow and pressure ratio at increasing rotor speed as shown in Fig. 1. A compressor's limiting operability characteristic is the stall line 12 beyond which stable compressor airflow cannot be sustained. A

compressor operating line 10 at a given airflow is lower in pressure ratio than the stall line 12 to provide a margin for engine transient operation. During engine acceleration, the compressor deviates from the steady state operating line10 and moves along a transient operating line 14. For the typical high-pressure compressor, the transient operating line 14 during acceleration is characterized by reduced stall margin across the engine operating range. Accessory power demand negatively affects transient operation by reducing the amount of stall margin available as illustrated in Fig. 2.

Compressor bleed air can be used to drop the operating lien of the compressor away from the surge line. While this technique is commonly used, it has several drawbacks such as increased engine noise impact, and compatibility of the high temperature exhaust with composite engine cowl structures.

Applicants have developed a system which simultaneously allows for reduced mechanical shaft power load and systems capacity to absorb and utilize the energy of compressor bleed air at low power. In accordance with the present invention, the system improves the gas turbine compressor operating line margin from the compressor surge line. In the system of the present invention, the torque change on a drive shaft is monitored and information about the torque change is supplied to a full authority digital engine control. The engine bleed air supply means is then operated in response to the measured torque change and is fed to a means for generating shaft power to operate accessories aboard the aircraft. This reduces the mechanical shaft power demand from the high pressure rotor of the gas turbine engine. Reducing the mechanical power demand lowers the compressor operating line, further allowing a given transient excursion with improved stall margin as shown by line 18 in Fig. 1.

With regard to the rejection(s) of the claims based on the combination of Wojciehowski et al. and Shafer, this rejection fails because neither reference discloses or suggests means for monitoring torque change on a rotor drive shaft which is indicative of a power demand change and a means for supplying information about said monitored torque change to a full authority digital engine control device.

The primary reference to Wojciehowski et al. relates to a liquid spraying system onboard an aircraft. The system includes a pneumatic motor (24) which is operated by bleed air from an engine compressor. The system also includes a poppet valve (46) which is used to control the flow of bleed air to the motor (24). Wojciehowski et al.'s system does not have any means for monitoring torque change on a rotor shaft and a full digital authority engine control (FADEC). Thus, it can not have means for supplying information about the torque change to a FADEC. Wojciehowski et al. further lacks means for supplying bleed air from the engine during a transient state *in response to said monitored torque change*. In fact, there is absolutely no reason or need to provide Wojciehowski et al.'s system with any of the claimed means.

The Schafer et al. patent relates to a system for indicating non-recoverable compressor surge and blow-out. The system includes a FADEC unit which is part of the fuel control system for the engine. There is no disclosure that the FADEC is provided with either a means for monitoring torque change on a rotor drive shaft and/or means for supplying information to said FADEC about said torque change.

The references taken alone, or taken together, simply do not teach one of skill in the art how to provide a system which increases the stall margin by reducing the demand on a rotor drive shaft.

Claims 23 - 25 are allowable for the same reasons as claim 20 as well as on their own accord.

For these reasons, the rejection of claims 20 and 23 - 25 should be withdrawn.

With regard to the rejection of claims 26, 27, 30, and 31, these claims are also allowable for the same reasons as their parent claims.

For the foregoing reasons, the instant application is believed to be in condition for allowance. Such allowance is respectfully solicited.

Should the Examiner believe an additional amendment is needed to place the case in condition for allowance, he is hereby invited to contact Applicants' attorney at the telephone number listed below.

Applicant does not believe a petition to revive is required; however, in the event that one is required, it is enclosed herewith. The Director is hereby authorized to charge the petition to revive fee of $1,620.00 to Deposit Account No. 02-0184.

Should the director determine that a fee is due, he is hereby authorized to charge said fee to said Deposit Account No. 02-0184.

Respectfully submitted,
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Date: June 29, 2009